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Glucosamine-like supplement inhibits multiple sclerosis, type 1 diabetes

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A glucosamine-like dietary supplement has been found to suppress the damaging autoimmune response seen in multiple sclerosis and type-1 diabetes mellitus, according to University of California, Irvine health sciences researchers.

In studies on mice, Dr. Michael Demetriou and colleagues with the UC Irvine Center for Immunology found that N-acetylglucosamine (GlcNAc), which is similar but more effective than the widely available glucosamine, inhibited the growth and function of abnormal T-cells that incorrectly direct the immune system to attack specific tissues in the body, such as brain myelin in MS and insulin-producing cells of the pancreas in diabetes. Study results appear on the online version of the *Journal of Biological Chemistry*.

“This finding shows the potential of using a dietary supplement to help treat autoimmune diseases,” said Demetriou, an assistant professor of neurology, and microbiology and molecular genetics. “Most importantly, we understand how this sugar-based supplement inhibits the cells that attack the body, making metabolic therapy a rational approach to prevent or treat these debilitating diseases.”

The UC Irvine study defines how metabolic therapy with the sugar GlcNAc and other related nutrients modifies the growth and autoimmune activitiy of T-cells. Virtually all proteins on the surface of cells, including T-cells, are modified with complex sugars of variable lengths and composition. Recent studies have shown that changes in

these sugars are often associated with T-cell hyperactivity and autoimmune disease.

In mouse models of both MS and type 1 diabetes, Demetriou and colleages found that GlcNAc prevented this hyperactivity and autoimmune response by increasing sugar modifications to the T-cell proteins. This therapy normalized T-cell function and prevented development of paralysis in MS and high blood glucose levels in type 1 diabetes.

This study comes on the heels of others showing the potential of GlcNAc in humans. One previous clinical study reported that 8 of 12 children with treatment-resistant autoimmune inflammatory bowel disease improved significantly following two years of treatment with GlcNAc. No significant adverse side effects were noted.

“Together, these findings identify metabolic therapy using dietary supplements such as GlcNAc as potential treatments for autoimmune diseases.” Demetriou said. “Excitement for this treatment strategy stems from the novel mechanism for affecting T-cell function and autoimmunity and the availability and simplicity of its use. However, additional studies in humans will be required to assess the full potential of this therapeutic approach.”

Autoimmune diseases such as MS and type 1 diabetes mellitus result from poorly understood interactions between inherited genetic risk and environmental exposure. MS results in neurological dysfunction, while uncontrolled blood glucose in type 1 diabetes can lead to damage of multiple organs.

Source: University of California - Irvine